RECREATION OF TRADITIONAL INDIGENOUS PALLANGUZHI TOY BY USING EGGS SHELL POWDER

Dissertation submitted to

ST. TERESA'S COLLEGE, (AUTONOMOUS) ERNAKULAM

Affiliated to

MAHATMA GANDHI UNIVERSITY

In partial fulfilment of requirement for the

AWARD OF THE DEGREE OF MASTER OF SCIENCE IN

HOME SCIENCE (BRANCH A)

CHILD DEVELOPMENT

By

MANEESHA RADHAKRISHNAN

Register No. AM23HCD007

DEPARTMENT OF HOMESCIENCE AND CENTRE FOR RESEARCH

APRIL 2025

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'Certified as bonafide research work'

….…… **……**

Signature of the Guide

Signature of the Examiner**…..…….**

…… Date Signature of the Head of the Department

DEPARTMENT OF HOME SCIENCE

AND CENTRE FOR RESEARCH

ST. TERESA'S COLLEGE(AUTONOMOUS),

ERNAKULAM

Ms Nimmi Jacob

Assistant Professor

Department of Home Science & Centre for Research

CERTIFICATE

This is to certify that the dissertation entitled, **Recreation of traditional indigenous Pallanguzhi toy by using eggs shell powder** is a Bonafide record of the work done by **Ms. MANEESHA RADHAKRISHNAN** under my guidance as partial fulfilment of the award of the degree of **Master of Science in CHILD DEVELOPMENT** at St. Teresa's College (Autonomous), Ernakulam affiliated to Mahatma Gandhi University, Kottayam. No part of this work has been submitted for any other degree elsewhere.

Ernakulam

29/04/2025

NIMMI JACOB

DECLARATION

I hereby declare that the work presented in this project is based on the original work done by me under the guidance of Ms. NIMMI JACOB, Associate Professor, Department of Home Science, St. Teresa's College (Autonomous), Ernakulam and has not been included in any other project submitted previously for the award of any degree.

MANEESHA RADHAKRISHNAN

Place: Ernakulam

Date:29/04/2025

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MANEESHA RADHAKRISHNAN

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CHAPTER 1

INTRODUCTION

Childhood is an important period of human development, laying the roots for mental, emotional, and social growth. It is a time of discovery, curiosity, and exploration during which children learn basic skills of life that define them in the years to come. The activities that a child experiences—like education, play, and association with others—strongly influence his or her personality, intellect, and well-being. Of these, play plays the most vital role. It is not just a source of entertainment but also a valuable tool for learning and self-expression. Play is the way children acquire physical, intellectual, imaginative, and interpersonal abilities. Child games like Pallanguzhi have been a part of childhood for generations, providing entertainment as well as learning value.

"Play is a free activity standing quite consciously outside 'ordinary' life as being 'not serious,' but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner." (Johan Huizinga - 1955)

In modern times, the significance of play is disregarded because more and more structured learning and online entertainment are in the limelight. Yet studies in child development emphasize that taking part in bodily, tactical, and interactive games promotes all-round development. Historical games, for instance, present special advantages in the form of maintaining cultural legacy, fostering bonding, and enhancing cognitive abilities.

Understanding the importance of childhood and the role of play in the development of young minds highlights the importance of reintroducing meaningful and traditional play experiences into children's lives. Offering children both structured and unstructured play experiences lead to healthier development, better emotional health, and a greater sense of connection to cultural heritage.

Ancient indigenous toys are of great cultural significance, demonstrating the abilities, values, and resourcefulness of previous generations. Pallanguzhi, which is a commonly known traditional South Indian game extending to certain areas of Southeast Asia as well, is an example. Having been played for centuries by women and children, the game is not only a form of entertainment but also fosters intellectual skills, mathematical skills, and thinking strategy. With modern gaming and electronic entertainment taking its toll, though, traditional games such as Pallanguzhi have lost favor over time.

In the midst of this cultural change, one has witnessed increasing efforts to revive traditional games with sustainable and green materials. One of the such innovative practices is utilizing eggshell powder as a main material for replicating the Pallanguzhi board. Routinely discarded as waste, eggshells contain a high concentration of calcium carbonate and are thus a good source for making biodegradable, long-lasting, and environment-friendly products. By adding eggshell powder to the production process of Pallanguzhi boards, this research aims to close the gap between cultural game traditions and contemporary practices of sustainability.

This work is worthwhile because it is multidisciplinary in nature and combines cultural heritage, environmental sustainability, and material innovation.

- It will revive indigenous traditional toys so that the younger generation can use and enjoy their heritage.
- It encourages sustainable behavior by reusing waste eggshells as useful, durable products.
- It investigates the use of biodegradable materials in the toy sector, cutting down on the use of plastic-based products that lead to environmental pollution.
- This research is consistent with international sustainability goals by promoting the reduction of waste and the creative utilization of natural resources.

Moreover, it provides artisans and toy producers with a chance to discover environmentally friendly substitutes that will benefit both the economy and environmental preservation initiatives.

Pallanguzhi is an age-old board game with a rich history and cultural heritage in South India and Southeast Asia. It is a game of strategy that is mainly played by women and children and is famous for developing cognitive powers. The game is traditionally played on a wooden board with fourteen pits using small seeds, shells, or pebbles as playing pieces. Although it is a culturally important game, Pallanguzhi has lost popularity with the introduction of digital entertainment and contemporary board games. Nevertheless, there has been increased activity in reviving traditional games such as Pallanguzhi in recent years, fueled by increased interest in preserving heritage and sustainable toy manufacturing. Learning about the history and cultural significance of Pallanguzhi will enable us to fill the gap between ancient tradition and modern innovation, and help future generations appreciate and play this indigenous game.

The history of Pallanguzhi can be traced to ancient Tamil culture, where it was played extensively as a game of recreation and learning. It is part of the Mancala family of games, which have been played for centuries in Africa, the Middle East, and South Asia. It has been reported in history that Pallanguzhi was played by women in Tamil homes as a favorite pastime and was played extensively at festivals and social events.

Archaeological evidence and temple carvings in South India show board games similar to Pallanguzhi, indicating its popularity in ancient cultures. Historically, Pallanguzhi boards were made of wood, stone, or even sketched on the ground, with tamarind seeds or cowpea seeds used as game pieces. In addition to recreation, the game was also used to educate children in arithmetic, logical thinking, and planning.

As time passed, Pallanguzhi spread to countries surrounding it, such as Sri Lanka, Malaysia, and Indonesia, where it was named and played in various ways. Though it has been centuries old, the game has not been able to sustain itself in the contemporary world. Yet, with increased attention to cultural heritage conservation and sustainable toy manufacturing, Pallanguzhi is back in the picture, reaffirming its significance in any debate regarding traditional board games and their place in the contemporary world.

So the present study is undertaken with the following objectives

Objectives of the Study

- To investigate the cultural and historical importance of the Pallanguzhi game.
- To evaluate the status and popularity of traditional games in modern society.
- To analyze the characteristics and appropriateness of eggshell powder as a material for the production of Pallanguzhi boards.
- To develop a prototype of a Pallanguzhi board produced from eggshell powder.
- To compare the sustainability, durability, and ease of use of the eggshell-based Pallanguzhi board with conventional materials.
- To recommend the integration of green materials into the manufacturing of traditional toys

CHAPTER 2

REVIEW OF LITERATURE

A literature review, is a written summary of journal articles, books, and other documents that describes the past and current state of information, organizes the literature into topics, and documents a need for a proposed study.
(Creswell -2005)

2.1 Pallanguzhi a traditional indigenous game
2.2 Reviving traditional games for child development
2.3 Eggshell powder as a sustainable material

2.1 Pallanguzhi a traditional indigenous game

Mansoor Rahman A et al., 2020 Indian Folk Games for Possible Therapeutic Benefits in Children with Neurodevelopmental Disability: the study of India boasts a rich cultural heritage, and there is an abundance of indigenous folk games that are culturally rooted. Because of the ease of accessibility, low cost, and high acceptability, this type of games can be added to aid and enhance physical fitness among children with neurodevelopmental disabilities. The research emphasizes the study of the therapeutic advantages of Indian folk games. The study therapeutic advantages of Indian folk games.The Conclusion of the study Folk games involve a range of functions and can in fact be used for therapeutic purposes in children with neurodevelopmental disabilities.

In 2006 Thomas Varghese and Daniel P McCusker conducted a of The reforms of globalization are compelling education systems of developing nations to emulate the curricula, teaching practices and evaluation tests of highly industrialized countries. Mathematics education based on and constructed from the local knowledge and/or cognitive background will be more effective and will provide more chances to marginalized communities. Ethnomathematics (mathematics of everyday life) in the curriculum situates mathematics in practical contexts. This paper

isolates some "everyday mathematics" from two southern states of India and examines how it can enhance classroom practices. School mathematics rooted in one's culture, practices and history could reorient the whole context of mathematics education and allow the learner to experience mathematics as a human rather than an abstract activity. Conclusion Within standardized, broadcast math curricula, concepts and teaching practices are dissociated from the knowledge and skills a child brings into the class room. Unless students understand that mathematics do exist in their own world, outside of school and outside of a Eurocentric world view, most of them will keep on complaining about it as being boringand uninteresting. Universalizing the curriculum for the sake of simplifying assessment or selling textbooks is not going to minimize the anxiety or even hatred that many students feel towards numbers. On the other hand, incorporating everyday mathematics into curricula will not only enable students to realize that mathematics is something to do with their culture, but will also enable them to establish connections between common everyday activities and academic mathematical practice. In addition, it will serve to build a bridge between school and parents, which is a very significant factor in student achievement. A focus on the socio-cultural nature of mathematics knowledge also encourages a shift away from purely occidental modes of mathematics education and allows entry into more active (e.g.; project-based, hands-on) and constructivist modes of learning

2.2 Traditional games for child development

In 2022 Hendra Mashuri conducted a study on Classic games to consolidate the character of students in educational qualifications . Physical education contributes significantly to shaping human character by enjoyable physical exercise. Among the enjoyable and virtuous physical exercises is the classic game. Traditional games are full of honorable values that are capable as learning character enhancers. This research examined the contribution of traditional games to reinforcing learners' character examined from the educational level. The research technique applied is a meta-analysis by verifying ten national journal articles constructed with the Glass formula. The results showed that traditional games have a very strong influence on strengthening the character of middle school education learners. At the elementary school level, traditional games have a high effect on strengthening the character of learners. But in the high

school category, the effect of traditional games towards building the character of students can be disregarded or the impact is negligible small he concluded his meta-analysis study aims to identify the effect of traditional games in building students' character using education levels. The results of this meta-analysis research can be concluded that traditional gamesstrongly influence elementary education students. At the level of junior high school education, traditional games are very influential in strengthening learners'
character. But the impact of conventional games on strengthening character at the level of high school education is less significant or the impact can be disregarded

In 2021 Muhammad Usman, Nidar Yusuf conducted a study on The Use of Traditional Games to Develop Early Childhood. The aim of this study was to explain and identify the functions of traditional games in enabling children's development. Today, with advanced times and technology, most parents and educators as early childhood teachers are not conscious about the significance of traditional games in maximizing the growth and development of early childhood. To be honest, traditional games are a good and budget-friendly option forchildren to develop. For this paper, the researchers endeavored to articulate the functions of
traditional Bugis games as a tool of early childhood growth and development. This research was qualitative in character since the researchers wanted to generate descriptive data (spoken or written) about individuals and observable behaviors when playing that may assist the growth and development of children. In gathering the data, various instruments were used by the researchers, including observation, interviews, and documentation. Data multiplication was conducted based on instrument characteristics. Results indicated that classic South Sulawesi Bugis games with or without equipment serve asmedia for physical, social-emotional, language and cognitive
children's development. The games becomean important source for children to socialize,learn to be a society member, and learn to respect the society's rules. During the game-and-play situations, children are able to also develop mathematical skills and reasoning.The study concluded that traditional games possess meaning and benefits for children. Through some of the traditional Bugis games discussed above, the physical, social-emotional, language and cognitive elements of children can develop. Children can socialize, become members of a society, recognize and appreciate human society. Sense of harmony will also increase, which is highly significant for

social development as a cultural human being. Inthe game situations, children are able to test and estimate their own potential and abilities. They will also learn to identify different objects and events that occur in their environment. During the middle of the game, every child can feel different emotions, such as excitement, satisfaction, and happiness. Pre-practice possibilities also exist for children to get used to the rules of the game, adhere to norms and bans, and behave honestly and loyally.

2.3 Eggshell powder as a sustainable material

In 2021,Navaratnarajah Sathiparan conduct a study on Prospects for the use of eggshell powder in sustainable construction materials This paper discusses the most recent research on the application of eggshell powder in building materials like concrete, cement mortar, brick, alkali-activated binder and a soil stabilizer. The physical and chemical characteristics of the eggshell powder and the parameters that affect the properties of eggshell power were also examined. The findings show that the properties of cementitious materials were enhanced. Particularly, 10–15% cement replacement with eggshell powder has the same strength development as the control. The use of eggshell powder as a stabilizer for soil and brick to enhance its mechanical property has been indicated by various studies. Eggshell powder is thus energy and cost-saving solution to the issue of sustainable construction material. The study concluded The chemical constitution of ESP has high calcium like in cement. Chemical constitution of ESP is mostly impacted by grinding, calcination temperature and treatment process. Phase transition is impacted by calcination. At temperature around $700 - 800^{\circ}C$, most $CaCO_3$ present in the eggshell

2022 In K.Nandhini, J.Karthikeyan conducted a study on Sustainable and more environmentally friendly production of concrete using waste eggshell powder as cementitious material Infrastructural construction is highlighting the use of new, affordable, and eco-friendly materials. Cement uses non-renewable resources in production, which has major environmental implications. Use of recyclable materials as an alternative to cement could help reduce these issues. A detailed review was conducted on the waste eggshells by using them in

construction. Physical, chemical, morphological properties of powdered eggshells (PES), fresh and hardened concrete properties of concrete mixed with the PES were explored. A 10–15% substitution of PES with cement gave rise to strength development and improved performance. The use of PES which provides a low-cost and energy-efficient material for construction.

In 2022 Blasius Ngayakamo ,Azikiwe Peter Onwualu conducted on Recent developments in green processing technology for valorisation of eggshell waste for green construction materials , This review paper focuses on appraising the potential uses of eggshell waste as a feedstock for production of sustainable construction materials. The emphasis is on the need to exploit extensively eggshell waste as a partial cement replacement material in clay and cement-based construction materials. The physical-chemical properties of eggshell powder which describe its unique characteristics are discussed. The exploitation of eggshell waste in various construction materials have resulted into an overall improvement in the physical-mechanical properties. The results from reviewed work show that, the incorporation of 5–30 % of eggshell powder has developed green sustainable construction materials with properties that are within the range for the established engineering standards. In the current paper, it was indicated that the valorisation of eggshell waste has a potential to replace cement material for production of cheap and sustainable construction materials with improved engineering properties. Based on circular economy, valorisation is regarded to be a cost-effective solution to provide eco-friendly industrial raw materials while ensuring a waste free environment in the future .The study concluded the article has provided insight into the possible applications of eggshell waste towards the production of sustainable construction materials. The valorisation strategy and incorporation of ESP in the production of concrete, clay bricks, ceramic tiles and compressed stabilised blocks (CSBs) has enhanced their engineering characteristics thus ensuring that they are sustainable, reducing cost and promoting environmental conservation. Partial substitution of ESP from 5-30 % gave rise to enhanced physical-mechanical properties of cement-based materials (sandcrete and concrete) and clay-based materials (tiles, CSEBs and clay bricks). Nevertheless, over-addition of ESP contributed to the weakening of mechanical strength of the respective materials. This paper demonstrates that; valorisation of ESP is a viable route for partial substitution of cement during the production of sustainable building materials. Although, eggshell powder possesses special

chemical characteristics with high calcium oxide/calcite content that render it as a viable cement substitute material for the manufacture of sustainable building materials

P. Murthi et al., 2022 a study conducted on the Impact of eggshell powder on structural and durability properties of high strength green concrete for sustainability Recycling of solid wastes is one significant objective for sustainability in the aim to conserve natural resources for coming generations. The construction sector is the major industry for using the largest quantity of natural resources. Eggshell powder (ESP) is a bio-waste material and also a viable material for cement replacement during the production of green concrete. This reduces the effect of eggshell disposal in landfill on the environment. Eggshell powder is high in calcium oxide content and ignites the researcher to replace cement in the production of concrete. This review report illustrates the applicability of ESP in high strength concrete according to the structural and durability performance seen from research results. From the evidence gathered from various research articles, it can be stated that 8–10% cement replacement is feasible without compromising the mechanical strength and structural behavior and it enhances the hydration process during the initial stages. Nevertheless, the ESP had presented a negative influence on durability characteristics, especially under the chemical conditions, and warrants further studies on this front. The findings established from different sources are discussed and emphasized in the present paper. The study concluded with tha CaO is the chemical composition of ESP of around 65% close to cement. The shell is around 95% $CaCO_3$. ESP is not to be construed as a mineral admixture because of extremely low composition of SiO_2 and can be regarded as supplementary cementitious material. Specific gravity of ESP is 0.85 to 2.96 and proved that it is lighter than cement. The maximum replacement of cement with ESP is determine

CHAPTER- 3

METHODOLOGY

"Recreation of traditional indigenous pallanguzhi toy by using eggs shell power "

3.1Selection of Area

3.2Selection of samples

3.3Selection of tools

3.4Data collection

3.5Analysis and interpretation

3.1.Selection of Area

The research is undertaken in the area selected for the study was Ernakulam, Kerala, the selection of area is important.The convenience of the Investicater and the is in the getting sample was the one of the reason for the area.

3.2 Selection of samples

The samples selected for the study was parents of age under 12 years to collect information regarding the use of toys by there children.the sampler selected for 75 samples of children belonging the age group of 0 to 12 years age.to collect information regarding general informational of the child, toy preference,emotional attachment-of toys, knowledge of indigenous toys, introduction of new toy, toy demand and choice of children ,impact of media and advertising, parental advance monitoring, satisfaction level. The sampling technique is purposive sampling

The children were selected to make the use of pallanguzhi toy. 12 preschool teachers evaluated the pallanguzhi board

3.3.Selection of tools

In this research, the tool selected the study was self structured questionnaire which collect the details of general Information of children ,toy preference,emotional attachment-of toys, knowledge

of indigenous toys, introduction of new toy, toy demand and choice of children ,impact of media and advertising, parental advance monitoring, satisfaction level.

Development of pallanguzhi toy using eggshell the traditional pallanguzhi toy was recreated by eggshell powder and corn starch and flex seed powder methods used in the appendix.

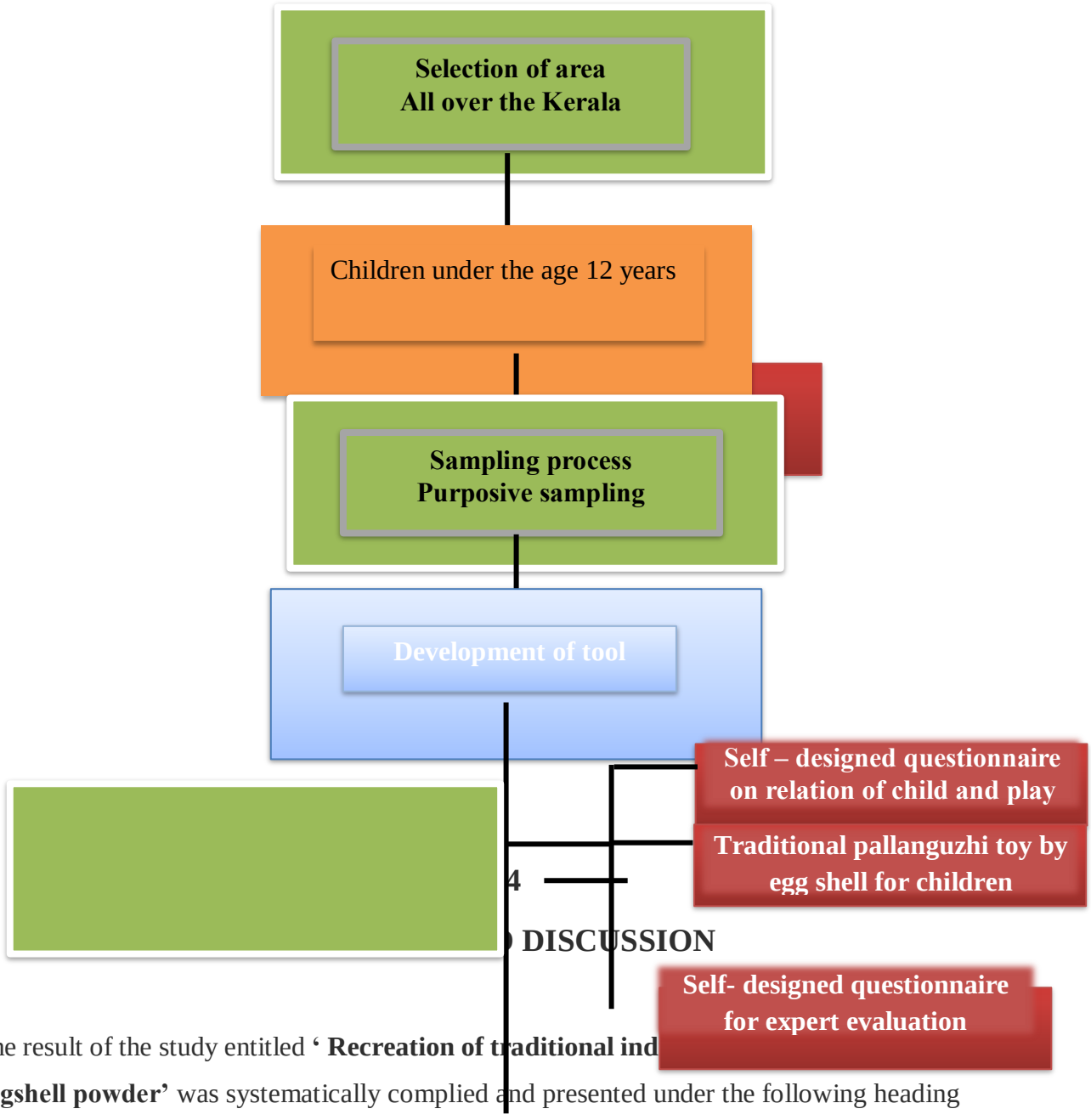
The toy was Evaluation by expert and understand the design and construction, safety and sustainability and educational and cultural value

3.4 Data Collection Process

The process of data collection involves several methods to make the response completely extensive. Questionnaires will be distributed among schools, play centers, and homes so that parents and children can reply. For young kids (3–6 years), face-to-face interviews will be conducted to authenticate understanding and proper response. Online surveys can also be done among urban parents to gather more information about the extent to which traditional toys are involved in child development.

3.5 Analysis and interpretation

The data collected from survey was organized into an excel sheet and calculate parents responses of there children toy's of each questions in disruptive methods. The data then tabulated, analyzed and interpreted using descriptive methods



The result of the study entitled ‘ **Recreation of traditional ind** **eggshell powder’** was systematically complied and presented under the following heading

4.1 Survey on Relationship of Children and Play

The objective of this survey is to determine some of the features of children's play, such as the duration of playing and the determinants of children's play behavior. The survey is comprised of

nine sections: general information, preferences for toys, feeling of attachment to toys, traditional toys, introduction of new things, demand and selection for toys, effects of media and advertising, parents' advice and control, and level of satisfaction. These areas of content are added to understand children's relationship with play in a complete manner.

4.1.1 TABLE :1Age ane gender of subjects.

SL.NO	PARTICULAR	RESPONDES	(N=75)	%
1	AGE	0-3 YEAR	9	12%
		4-6 YEAR	21	28%
		7-12 YEAR	45	60%
2	GENDER	FEMALE	42	56%
		MALE	33	44%

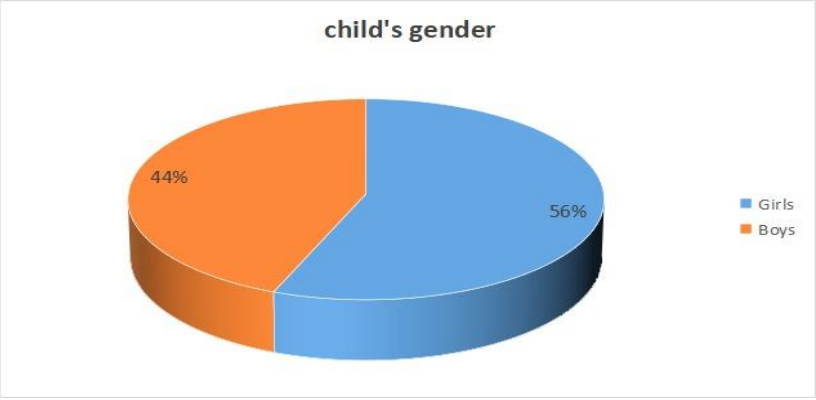


Figure :2

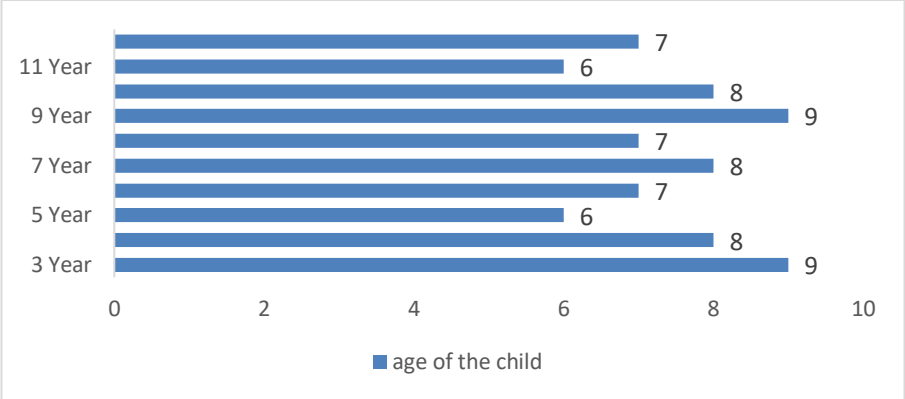


Figure :3

The pie chart, child's gender, indicates that of all the 75 children questioned exactly more than half—56%—were girls and the other 44% were boys. . Pictorially, the bigger blue piece depicts girls, and the slightly smaller orange piece depicts boys. The difference between the two groups—12 points—informing us that the girls outnumber boys by a striking but not preponderant measure in this subgroup

4.1.2 Most preferred toy's by the children

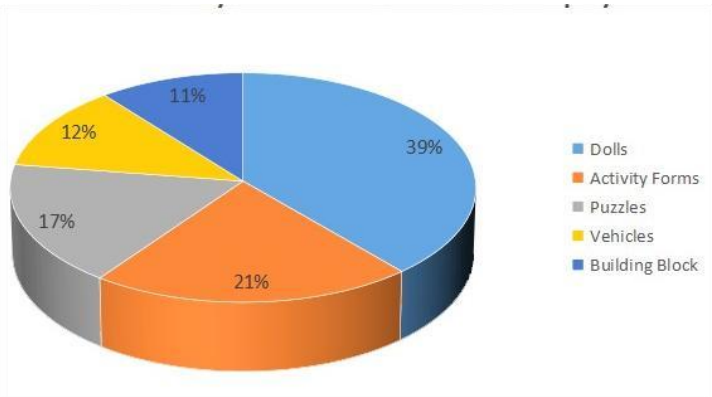


Figure :4

The pie chart shows the categories of toys most commonly played with by children, and these have been divided into five groups. The leading category is Dolls, accounting for 39% of the whole, showing that there is a very high preference for this type of toy among children. This is followed by Activity Forms accounting for 21%, which means that a considerable number of children play with toys involving active engagement or movement. Puzzles are 17%, showing an interest in problem-solving and mental activity. Vehicles are the choice of 12%, while Building Blocks are the least, at only 11%. Generally, the chart shows that although dolls are the favorite among children's play activities, a variety of toy types also contribute to their play activities.

4.1.3 Child interest to play with

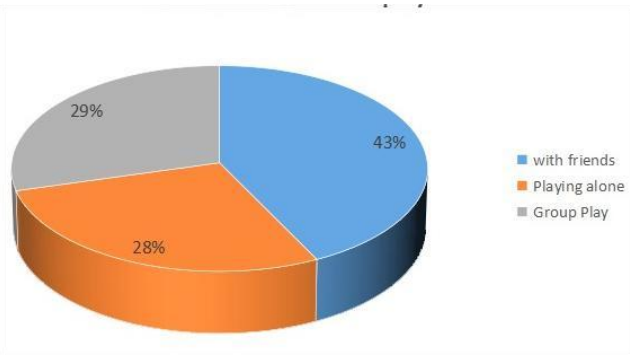


Figure :5

The pie chart illustrates the child's preferences for different types of play. It shows that the majority of the child's playtime preference is playing with friends, which accounts for 43% of the total. This indicates a strong inclination toward social interaction and shared play experiences. Group play

follows closely at 29%, suggesting that the child also enjoys being part of larger play settings involving more than just one or two friends. Playing alone is the least preferred mode, with 28%, although it still represents a significant portion, indicating that the child values solitary play to some extent. Overall, the chart highlights that the child favors social play over solitary activities, showing a natural tendency toward engaging with peers

4.1.4 Factors influencing the selection of toys

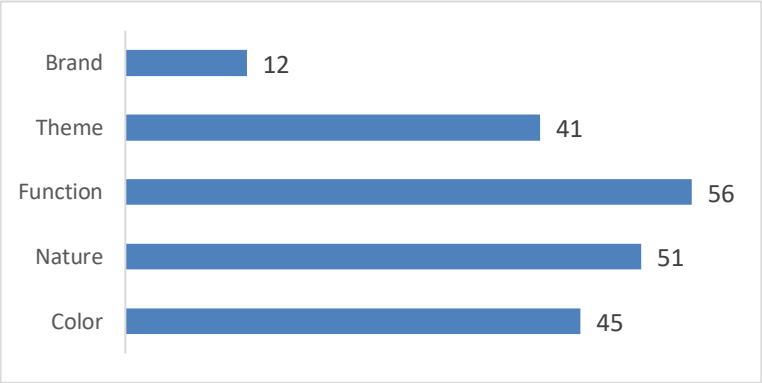


Figure :6

a horizontal bar chart It shows the factors affecting toy selection with five key elements highlighted: brand, theme, function, nature, and color. Out of these, function stands out as the most influential with 56 points, meaning that the useful purpose or function of a toy matters most when making a selection. Nature of the toy is a close second with a score of 51, hinting that safety and material are also of great importance. Color and theme are moderately influential, scoring 45 and 41 respectively. Brand is the least influential of all, scoring only 12, which infers that brand name is not important in the decision process when choosing toys. This information indicates that consumers value a toy's functionality and intrinsic attributes above brand reputation.

4.1.5 child’ reaction when their favorite toy is lost or broken

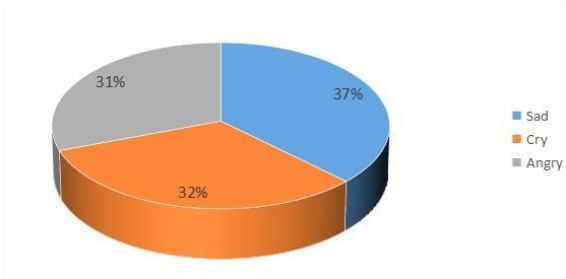


Figure :7

The pie chart represent the emotional reaction of children when they lose or damage a favorite toy. The pie chart consists of three pieces, each to represent a unique emotional response: sadness, crying, and anger. The majority of the pie, 37%, indicates that the most prevalent response among children is to be sad. This implies that most children internalize the experience and manifest their feelings through quiet despair or withdrawal. The second largest group, representing 32%, suggests that large numbers of children react to the breakage or loss of their toy by crying. This reaction is a more external and expressive method of demonstrating distress. Finally, 31% of children are demonstrated to respond with anger, possibly in the form of tantrums, frustration, or aggressiveness. As a whole, the chart illustrates that children's responses to this kind of scenario are diverse yet comparatively balanced, as all three emotional responses—sadness, crying, and anger—are close to equally common. This goes to emphasize the significance of realizing and empathizing with children's emotional needs amid episodes of disappointment or loss

4.1.6 child sleep with a special toy

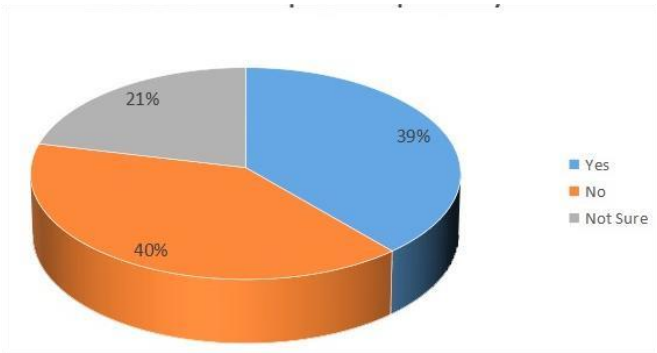


Figure :8

The pie chart displays the answers of the participants in terms of whether a child would sleep with a special toy or not. The chart is cut into three portions. Most of 40% of the respondents said No, indicating that a large number of children might not like or need a special toy to sleep. Close behind, 39% replied Yes, indicating that almost an equal number of children do sleep with a special toy. Finally, 21% of the participants were Not Sure, suggesting some uncertainty or lack of information regarding the child's sleeping habits in terms of special toys. Overall, the answers are quite balanced, with a slight lean towards children not sleeping with a special toy

4.1.7 Child ever name a toy or behave like a friend

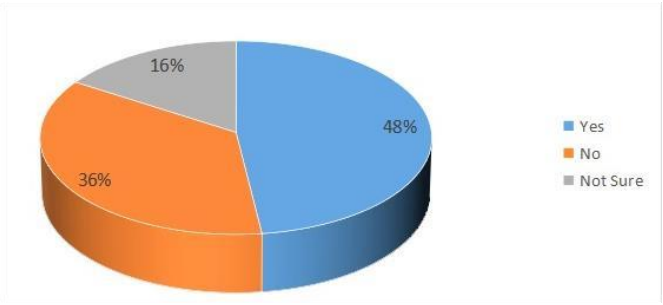


Figure :9

The pie chart shows the answers to whether children anthropomorphize toys by giving them names or considering them friends. The biggest chunk, 48%, replied Yes, meaning that almost half of the children practice imaginative play by giving names or friendly roles to their toys. In contrast, 36% of the participants reported N, meaning that more than a third of children do not practice such behavior. Finally, 16% chose Not Sure, indicating some uncertainty or lack of observation in this

area. In general, the chart indicates that a large percentage of children do play symbolically or imaginatively with toys, which is a typical part of childhood development.

4.1.8 No.of hours the spend playing with the toys

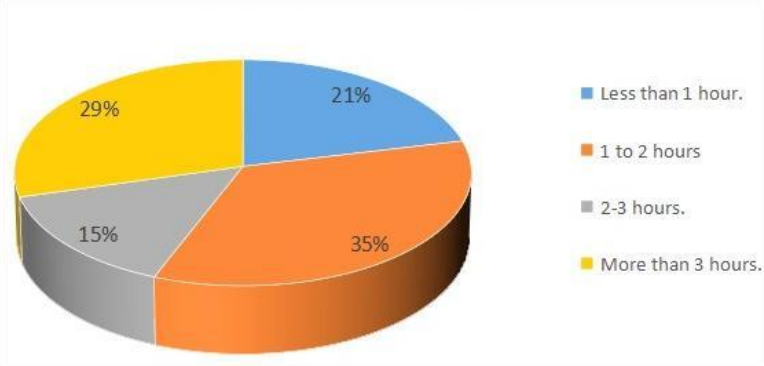


Figure :10

The pie chart labeled shows the proportion of time that children are usually spent playing with toys every day. The most frequent, 35%, of the children were said to play with toys between 1 and 2 hours a day and constitute the most frequent playing time in total. 29% of children play for over 3 hours. There is a smaller group of 21% that spends less than 1 hour a day on toy play, and 15% spend 2 to 3 hours in playing with toys. This pattern indicates that the majority of children spend a moderate to high level of time on playing with toys every day, which is critical for their cognitive, social, and emotional development.

4.1.9 Parents Knowledge of traditional games

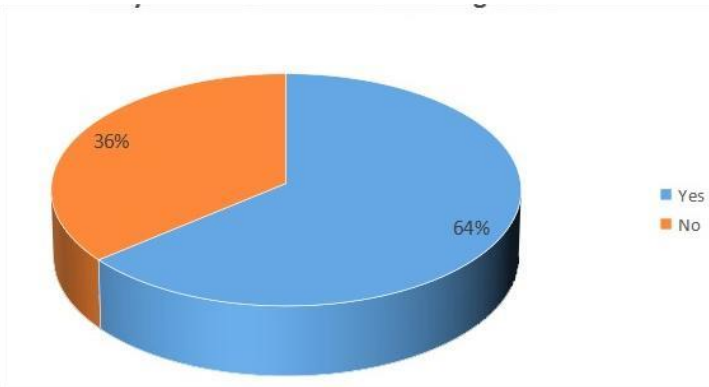


Figure :11

The pie chart illustrates the awareness level among respondents of traditional games. 64% responded with a Yes, which means that over half of the respondents are aware of traditional games, which indicates a good level of cultural awareness or exposure to heritage play. However, 36% said No, which illustrates that over one-third of the respondents are not aware of traditional games. This brings to fore a possible lack of cultural transmission and indicates a call for enhanced efforts in renewing and perpetuating traditional styles of play in younger generations.

4.1.10 Source of information about traditional toys

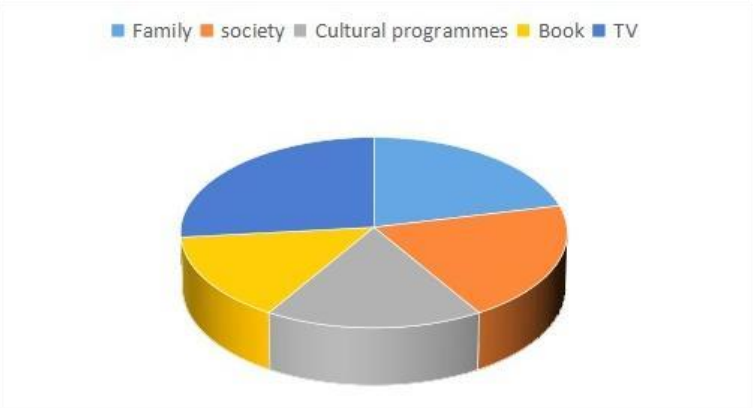


Figure :12

From the visual representation, itwas can be observed that all five sources have a fairly balanced proportion, meaning that individuals learned about the toys from diverse channels and not from a

single source. The Family and Society segments (blue and orange respectively) seem to be slightly more prominent, implying that such social settings had an impact in passing information about the toys. The Cultural Programmes and TV ad also account significantly, portraying the impact of media and old-time events. Finally, Books, in yellow, display a lesser share but are still a worthy learning source.

4.1.11 Indigenous toys are important for preserving cultural heritage

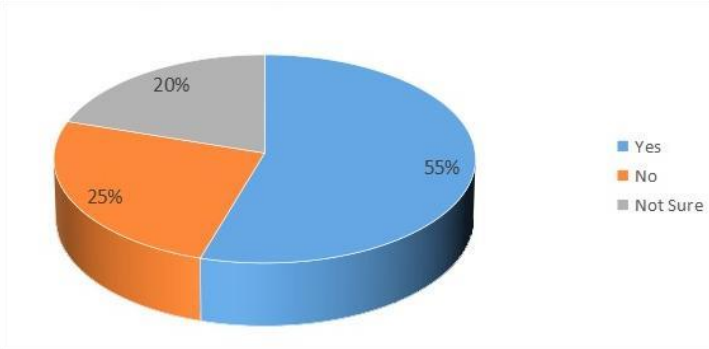


Figure :13

The pie chart shows a majority of the participants, that is, 55% of them said Yes. This means over half of the participants agreed or concurred with the idea or statement in question. On the other hand, 25% of the participants . The other 20% said Not Sure, indicating some indecision or uncertainty among the participants. Generally, the graph points out that although the majority were inclined positively towards indigenous toy, there is still a significant percentage who were opposed or undecided.

4.1.12 Purchase of indigenous toys

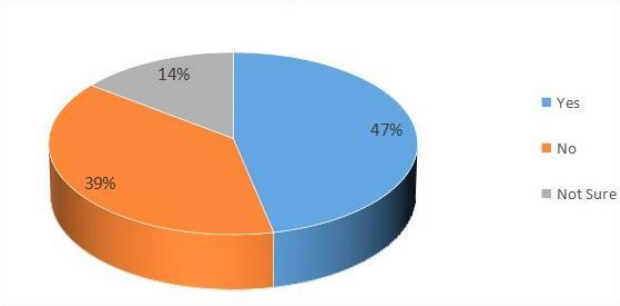


Figure :14

The pie chart shows the answers to the 47% Yes, that is almost half of the participants who do consider indigenous toys within reach where they live. 39% replied No, proving that a high percentage of society has no convenient access to the aforementioned toys. Also, 14% of respondents chose "Not Sure," indicating a degree of uncertainty or lack of awareness about the availability of indigenous toys in their area. In all, although a good majority of individuals confirm their availability, the answers also indicate a need for better accessibility and awareness.

4.1.13 How you usually access or purchase indigenous toys

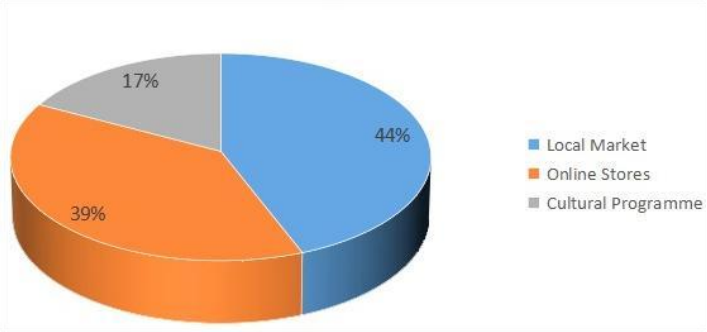


Figure :15

The pie chart provides an indication of how people tend to access or buy indigenous toys. Based on the information provided, most participants (44%) acquire these toys from local markets, reflecting the fact that local marketplaces continue to be an important source of such products. Next, 39% of the participants noted buying indigenous toys through online stores, reflecting that online platforms are also a popular and convenient access method. Concurrently, 17% cited cultural programmes as their source, indicating that community events and cultural events

contribute to a lesser, but still important, extent in making indigenous toys accessible. Overall, the chart indicates a mix of traditional and contemporary buying habits among consumers.

4.1.14Preferrence for the need for availability of more toys

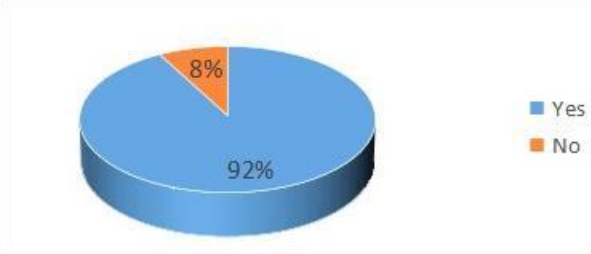


Figure :16

The pie chart shows answers to the question: Do you think that you need more accessible and affordable indigenous toys An overwhelming majority of the respondents, 92%, said Yes reflecting a high demand for easier accessibility and affordability of indigenous toys. Just 8% of the participants said No indicating that very few people are content with the present availability and price of such toys. This information identifies a clear need for efforts toward improving the production, distribution, and affordability of native toys to serve community better and retain cultural heritage.

4.1.15 How often do you introduce new toys to the child

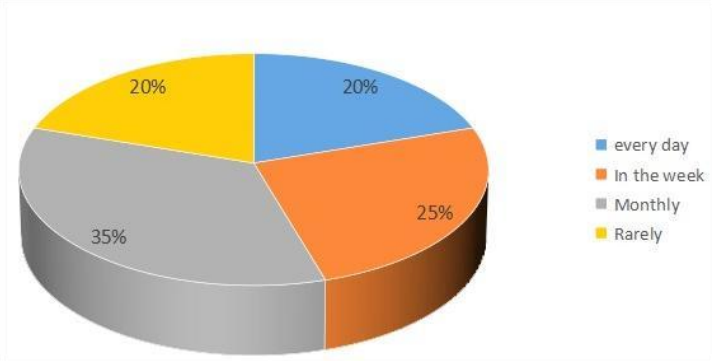


Figure :17

The pie chart shows the frequency at which parents introduce new toys to their children. From the data, the largest number of respondents, 35%, introduce new toys monthly, showing that most parents like to introduce new items at regular but spaced intervals. This is followed by 25% who introduce toys within a week, indicating a more frequent introduction of new toys. At the same time, 20% of parents report introducing new toys daily, representing a smaller but steady group who offer new play options on a daily basis. Another 20% report rarely introducing new toys, perhaps because of budget issues, liking minimalism, or other factors. Overall, the chart reveals a mixed pattern, with monthly introduction being the most prevalent practice.

4.1.16 What motivates you to introduce new toys to your child

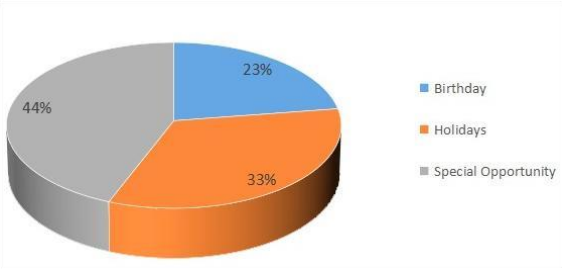


Figure :18

The pie chart demonstrates the main reasons why parents bring new toys to their children. The biggest share of respondents, 44%, reported that they are driven by exceptional opportunities, for instance, rewards for accomplishments or milestones. This indicates that a lot of parents apply toys as a reward or incentive. At the same time, 33% of respondents said that holidays make them provide new toys, which testifies to the role of festive periods in triggering toy buying. Finally, 23% of parents present new toys on their child's birthday, which is the least frequent but still

existing encouragement. Generally speaking, the chart testifies that although birthdays and holidays are significant events for presenting toys, special moments and achievements have an even greater importance.

4.1.17 How to choose new toys for the child

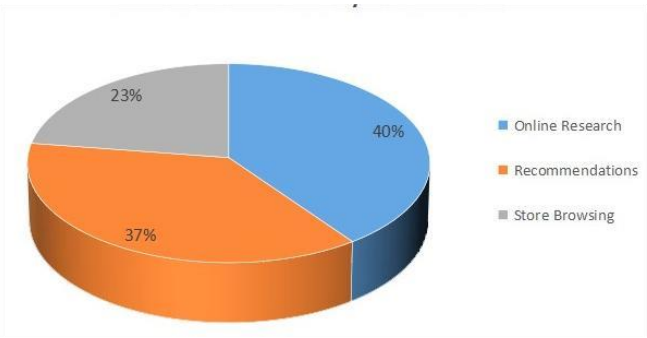


Figure :19

The pie chart illustrates how parents usually select new toys for children. The majority of parents, at 40%, use online research, which explains that most parents prefer to browse reviews, ratings, and comprehensive details on the internet before they buy. Not far behind, 37% use recommendations, most probably from family and friends, or parenting networks, indicating how crucial trust and experiential relationships are to decision-making. 23% use store browsing to select toys, which implies that face-to-face contact with products remains an influence for some parents. Overall, the chart indicates a strong leaning towards socially influenced and informed toy choice, with online platforms having an important role.

4.1.18 Factors that influence to buy toys for child

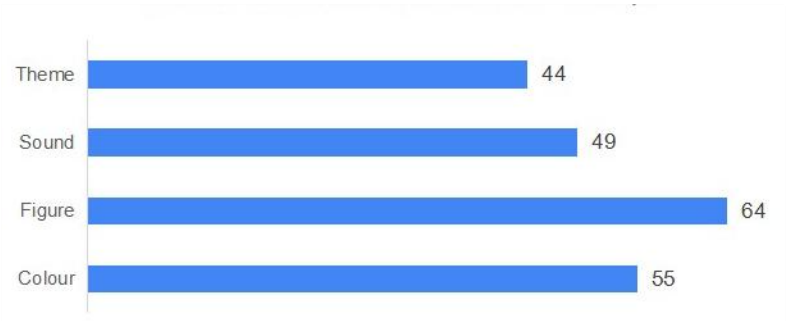


Figure :20

The bar chart explains some of the factors that affect a child's engagement with new toys. The factors considered are theme, sound, figure, and colour. Of all these, "Figure" is the most important, scoring higher at 64, which means the shape or form and the character of the toy are most attractive to children. Colour ranks second with a score of 55, which indicates the colour also counts. Audio is less influential with a score of 49, implying that audio features play a moderate role in a child's interest. Theme has the lowest score of 44, implying that it plays the least significant role among the factors listed. Generally, the graph implies that physical and visual elements of toys are more likely to appeal to children compared to thematic or auditory elements.

4.1.19 Child react to lost or broken of their favourite toy

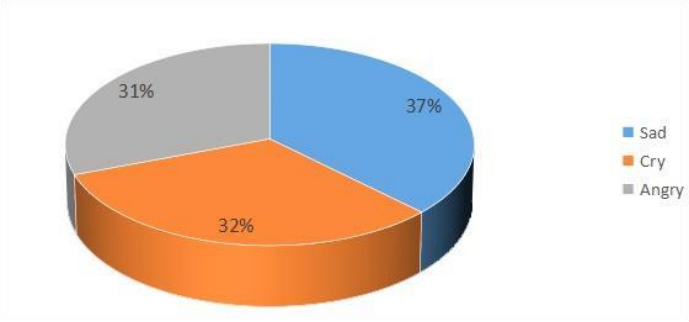


Figure :21

The pie chart also demonstrates the emotional reactions of children who lose or have their favorite toy broken, sorting their reactions into three general categories: sadness, crying, and anger. Of these, sadness is the most widespread, with 37% of children expressing this emotion. Coming a close second, 32% of children cry, and 31% get angry. While sadness is a bit more common, the

ratios are quite close, demonstrating that all three emotions are widely felt. The equal division implies that losing or shattering a beloved toy tends to cause extreme emotional upset in youngsters, demonstrating the intensity of attachment with their toys.

4.1.20 Factors that influence the child when choosing a toy

Figure :22

The bar graph shows the different factors that affect the decision of children in choosing a toy. As per the chart, the most affecting factor is the character of the toy, which got 57 votes, meaning that kids are greatly attracted to toys having certain characters, which may be cartoons or movies. This is closely followed by the toy's shape, with 51 responses, implying that the toy's shape or design is also a crucial factor in their choice. The color of the toy is next, with 47 responses, indicating that appearance based on bright or favorite colors is another overriding factor in choosing a toy. Finally, the theme of the toy, e.g., adventure, fantasy, or educational themes, got 42 responses and was the least impactful among the four listed factors.

Overall, the chart indicates that kids' preference for toys is highly influenced by character association and visual aspects such as design and color, with theme elements influencing somewhat less, but nonetheless significantly, to some degree.

4.1.21 child’s knowledge of information of new toys

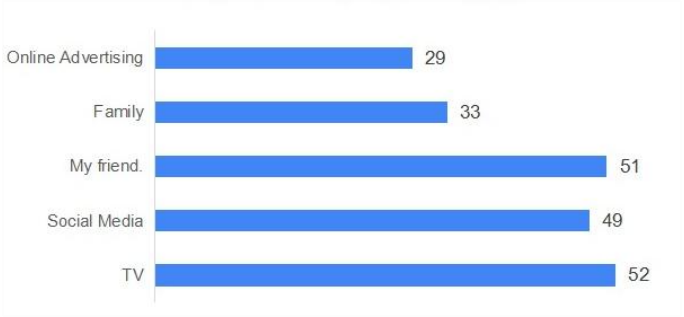


Figure :23

The bar chart shows the different sources by which children generally become aware of new toys. Based on the statistics, television is the most frequent source, with 52 children naming it as their main source of learning about new toys. This is followed closely by friends 51 children and social media 49 children, indicating that peer influence and online platforms are important in influencing children's knowledge of new toys. Family members are also a significant source, with 33 children discovering toys through them. Online advertising is the least effective among the given sources, with a mere 29 children mentioning it as their common method of finding out about toys. In general, the graph points out that old media such as TV and interpersonal communication—both from friends and family members—continue to be important in shaping the learning of children about new toys, even in the age of digitization

4.1.22 children's toy preferences changes over time

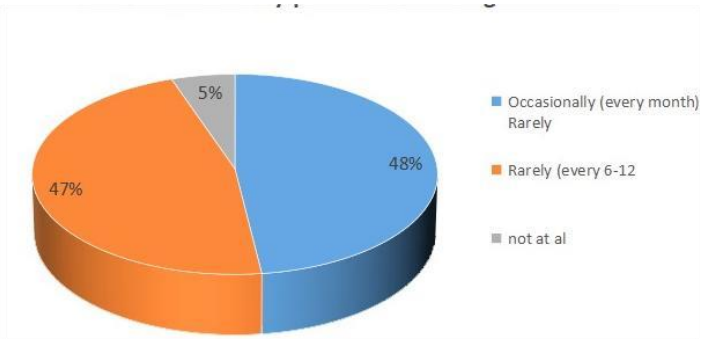


Figure :24

The pie chart entitled How children's toy preferences change over time shows that the majority of children show regular changes in their toy preferences. The highest segment, 48%, colored blue, shows that almost half of the children switch their favorite toys every month. A closely trailing 47%, colored orange, switch their preferences gradually, every 6 to 12 months. Only a minority, 5%, represented in gray, have stable toy preferences over time. This distribution indicates a general trend of variability in children's interests, with the point being that most tend to change their focus to new toys on a regular basis, with changes at least every few months.

4.1.23 Time spends on the screen in a day

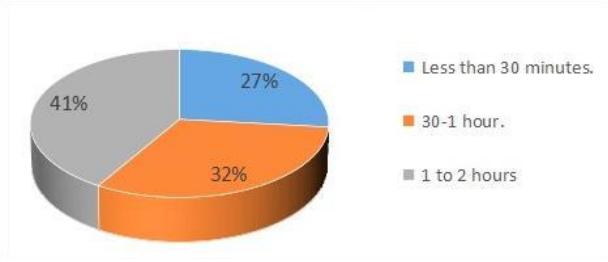


Figure :25

The pie chart, How much time a child spends on the screen in a day, shows the screen time habits of children on a daily basis. Based on the data, the biggest percentage—41%—of children spend 1 to 2 hours per day on screens. Following closely, 32% of children spend 30 minutes to 1 hour per day. In contrast, a smaller percentage, 27%, spend less than 30 minutes on screens per day. This graph shows that the majority of children have some exposure to screens, with the most spending over 30 minutes per day, and a considerable amount up to 2 hours.

4.1.24 What kind of media does the child use

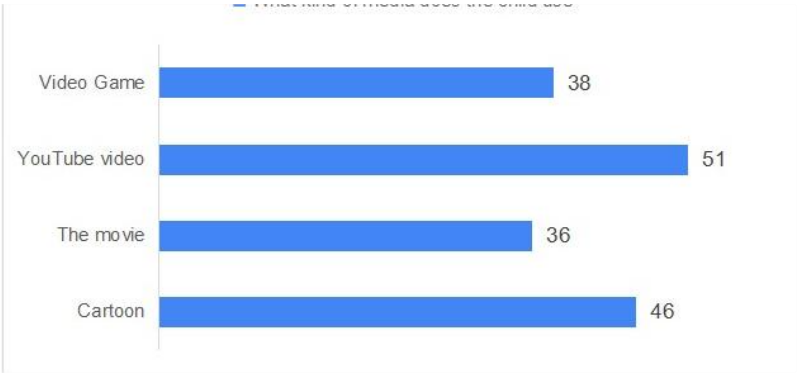


Figure :26

The bar chart displays the usage types of media and the number of users per type. Out of the four, YouTube videos are the most widely used, with 51 children using this usage type. Cartoons come next, with 46 users. Video games are also used widely, with 38 children said to use them. The most underutilized medium among the given choices is movies, with 36 users. This information indicates that interactive and digital media, like YouTube and video games, are more popular among children than conventional ones like movies.

4.1.25 How often does the child watch a toy ad on TV or online

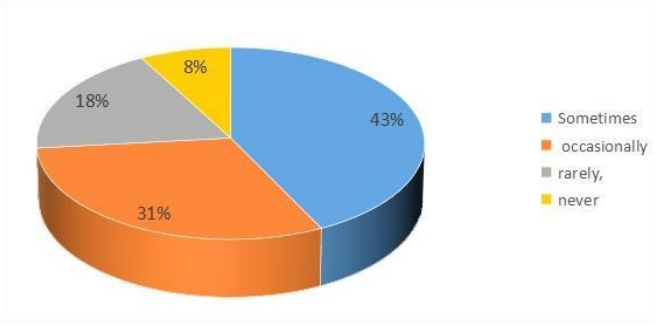


Figure :27

The pie chart displays the frequency of children's exposure to toy adverts on television or websites. Most of the respondents 43%, mentioned that their child occasionally views toy adverts, reflecting a medium rate of exposure. A substantial proportion 31% stated that their child occasionally views toy adverts, which also indicates a reasonably regular but not everyday practice. At the same time, 18% of the respondents said that their child hardly watches such commercials, and a few, 8%, said that their child never watches toy commercials. In general, it is shown by the data that the majority of children have at least some level of exposure to toy commercials via media, but only a minority lack exposure to some extent or another. This trend indicates the increased power of digital and TV advertising over children's tastes and interests.

4.1.26 Children demand for toys sees in an add or on TV

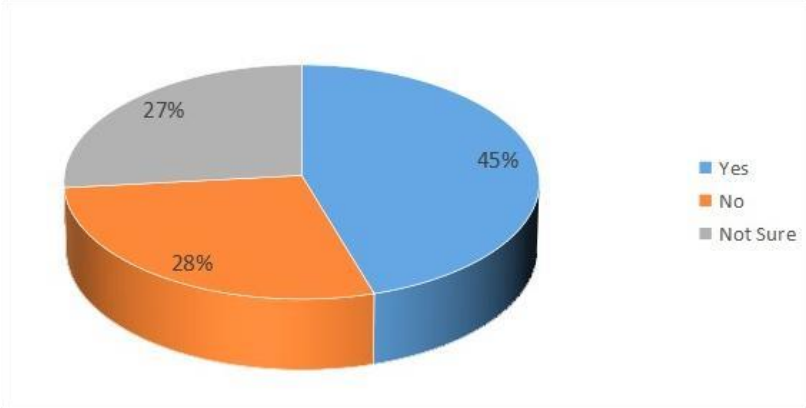


Figure:28

The pie chart labeled Does the child ask for the toys he sees in on TV shows that children react to toy commercials. From the information, 45% of the children actually do ask for toys they see on TV or in advertisements, showing that commercials greatly affect what they want. In the meantime, 28% of children don't request such toys, which indicates a less influence of adverts on this demographic. The remaining 27% of the survey participants are in doubt regarding the child's response in this matter. In summary, the graph indicates that advertisement has a serious influence on shaping the preferences of children and the toys they want.

4.1.27 Sensory feature in a toy represented

Figure :29

The bar graph illustrates information regarding the most frequently used types of media by children. Based on the chart, the most popular media type is YouTube videos, which 51 children reported using. This indicates that children are strongly interested in online video content, probably because of its extensive array of entertainment and educational content.

After YouTube, cartoons are the second most used type of media, with 46 children viewing them. This suggests that conventional animated programming remains very popular with children. Video games are the next, with 38 children playing this interactive type of media, showing its increasing popularity and engaging nature. Lastly, films are the most sparingly utilized medium type in this category, and 36 kids reported watching them, although again the difference isn't significant versus video games.

In all, the graph indicates a drift towards digital and interactive media, especially sites like YouTube, while also indicating that older forms such as cartoons and films continue to be used within children's media use.

4.1.28 What kind of experience do your child gaining by playing with toys

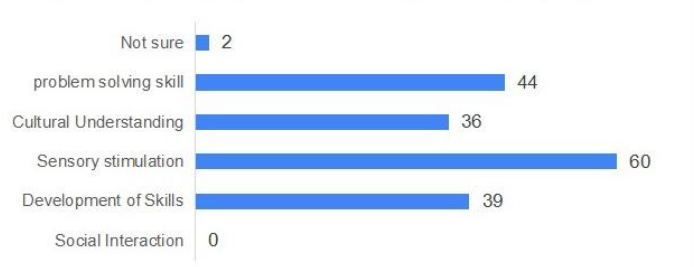


Figure :30

The bar chart shows parents' views of the kinds of experience children get from playing with toys. The most widely seen benefit is "Sensory stimulation," with 60 people citing it as an important experience. This is then followed by "Problem solving skill respondents and Development of Skills 39 respondent. Cultural Understanding was chosen by 36 respondents, showing a moderate level of perceived value. Few parents 2 were Not sure about the experiences their children receive, and significantly, none mentioned Social Interaction as an advantage, which would imply that toys are not commonly viewed as a means of encouraging social skills within this group. Generally, the data indicates that cognitive and sensory development are the most identified advantages of toy play

4.1.29 Toys contribute to sensory stimulation(touch,sound,sight)

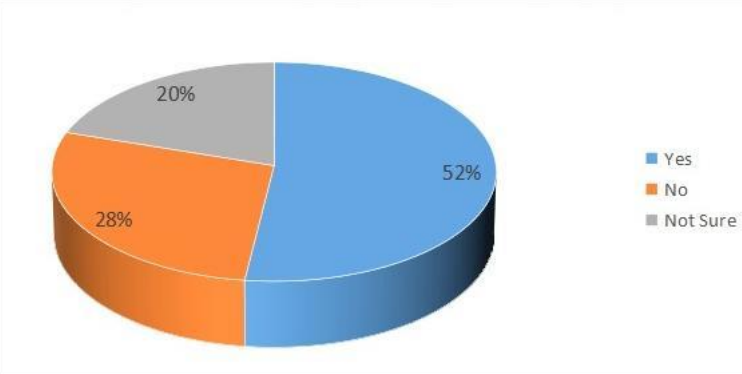


Figure :31

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The pie chart shows parents' views on whether they think their child's toys can help with sensory stimulation, e.g., through touch, sound, or vision. Based on the chart, more than half, 52%, of the respondents opine that toys actually assist in sensory development. The remaining 28% of parents do not perceive toys to be helpful in sensory stimulation. At the same time, 20% of the respondents are not sure whether toys affect sensory experiences or not. This information indicates that

although more than half of the parents identify a sensory advantage in toys, a considerable part remains either doubtful or uncertain.

4.1.30 If there yes

What do you believe are the most important sensory features in a toy

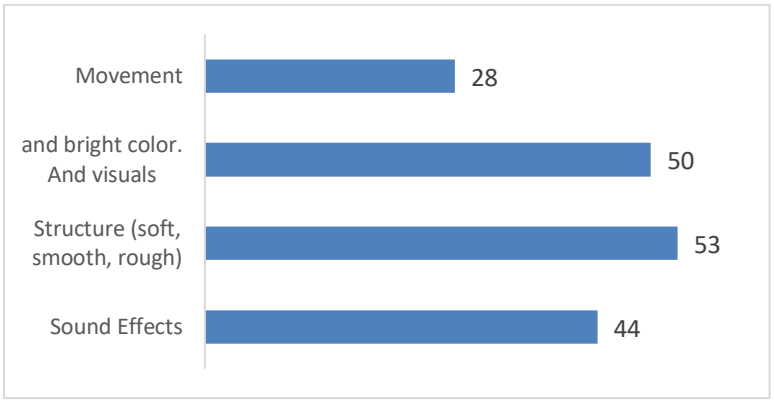

Figure :32

The bar graph shows the answers to the question: What do you think are most significant sensory features in a toy The sensory features considered are movement, color and visuals, structure (e.g., soft, smooth, rough), and sound effects. In the options given, structure was considered most significant by 53 people, closely followed by bright color and visuals with 50 votes. Sound effects, on the other hand, were also thought to be very important, with 44 votes. Movement was the least considered feature, as only 28 of the respondents voted for it as a major sensory feature. This information indicates that visual and tactile features trump kinetic features in the design of sensory toys

4.1.31 Money spend on toys per month

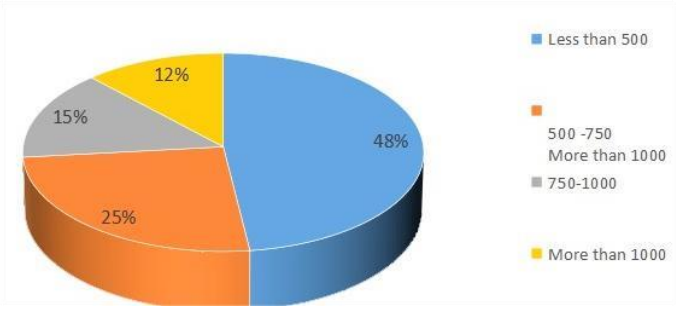

Figure :33

The pie chart represents the monthly spend on toys for kids, according to various spending categories. A large majority of the respondents 48% spent less than ₹500 per month, suggesting a taste for cheaper or lower-end toy shopping. Next, 25% of the participants spend between ₹500 to ₹750 indicating a relatively moderate level of investment in toys. In the meantime, 15% of the respondents spend ₹750 to ₹1000 and 12% spent more than ₹1000 per month on toys.

4.1.32 Taking good care of the toys

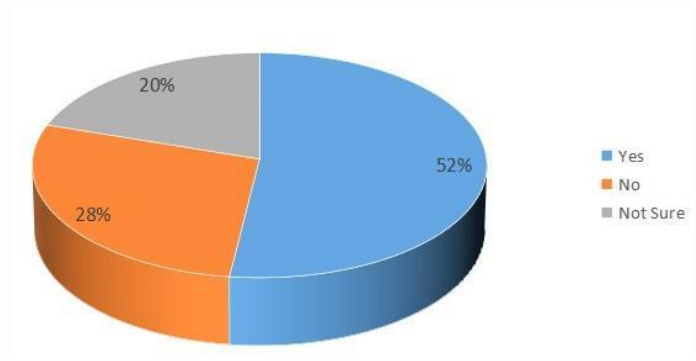

Figure :34

The pie chart named Are your kids taking good care of the toys shows the answer of parents or guardians about how well their children take care of their toys. Based on the chart, most, 52%, think that their kids are taking good care of the toys. At the same time, 28% of respondents think that their children are not taking good care of their toys. The other 20% are unsure or "Not Sure" regarding their children's behavior towards this. This information indicates that although more than half of the respondents are sure of their children being responsible with toys, many still harbor concerns or are not certain regarding this.

4.1.33 Share their toys with others

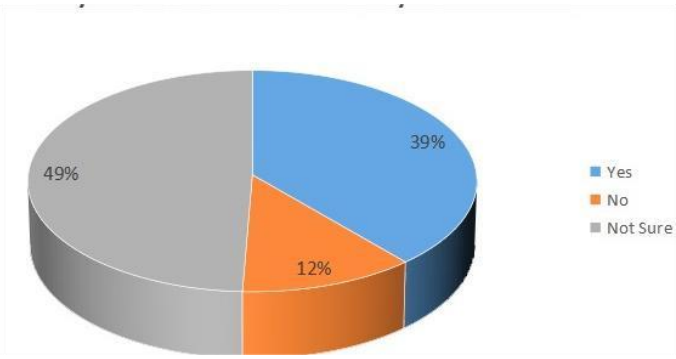

Figure :35

The pie chart illustrates the responses to the question, "Do your children share their toys with others?" The chart is divided into three segments, representing different responses. A total of 39% of respondents answered Yes indicating that their children do share their toys with others. Meanwhile, 12% responded with No suggesting their children do not engage in toy sharing. The largest portion, 49%, selected Not Sure reflecting uncertainty or lack of observation regarding their children's behavior in this regard. This distribution suggests that while a significant number of children are perceived to be sharing, nearly half of the parents or guardians are unsure about their children's toy-sharing habits.

4.1.34 Factor that influences to buy toys for child

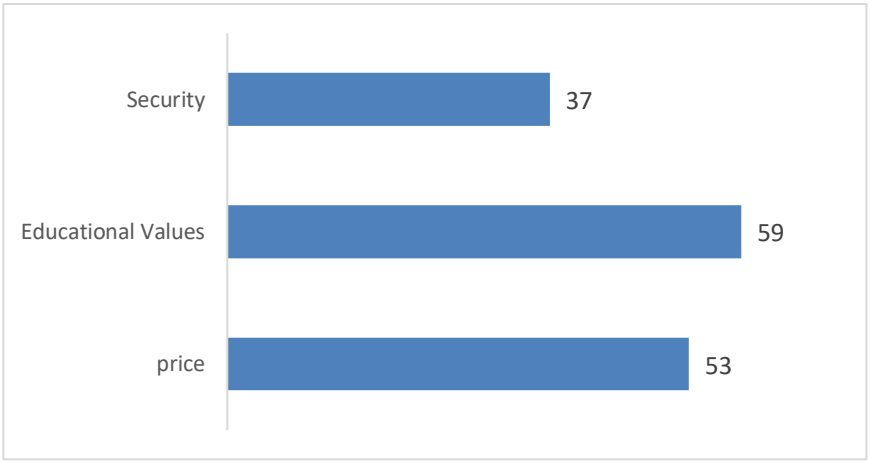

Figure :36

The bar chart depicts the most critical factors that make parents decide on what to buy when buying toys for their children. Of the three factors mentioned—Security, Educational Values, and Price—Educational Values are the most significant, as 59 of the respondents picked this factor first. Price comes in second as a deciding factor for 53 of the respondents. Security is the least important of the three, with 37 of the respondents picking this as their main concern. This information indicates that parents consider the educational value of toys as most important, then the price, and sometimes the safety features

4.1.35 Safe toys are preferred by majority of the respond

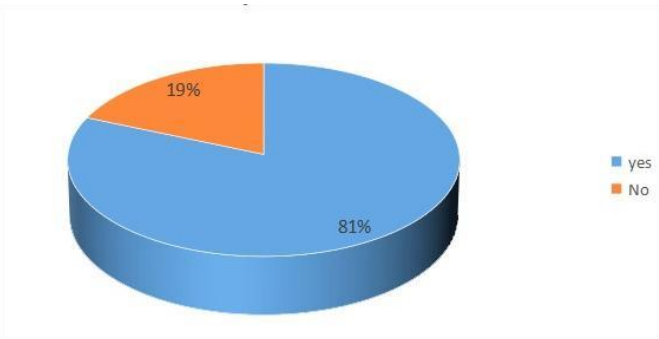

Figure :37

The pie chart answers to the question, Did you ever take back or swap a toy for safety reasons or other reasons The chart indicates that a very strong majority of them, 81%, reported they have taken a toy back or swapped it out for such reasons, indicated by the larger blue portion of the chart. Contrarily, only 19% of them, as indicated in orange, have said that they have not returned or exchanged a toy for such reasons. This information implies that toy safety and other such concerns are frequent enough to cause most consumers to take action through returning or exchanging products.

4.1.36 changes in your child's behavior or abilities since the introduction of the new or play material

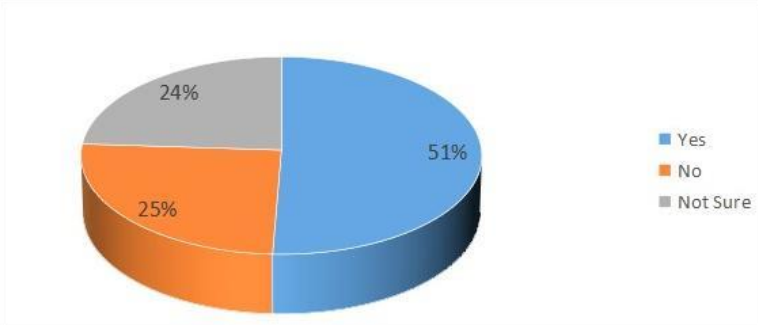

Figure :39

The pie chart shows responses Have you noticed any changes in your child's behavior or abilities since the introduction of the new or play material The majority of respondents 51% answered Yes indicating that over half of the participants observed positive or notable changes in their child after being introduced to new play materials. Meanwhile, 25% responded No suggesting they did not perceive any noticeable impact. Moreover, 24% of the respondents chose Not Sure indicating uncertainty or lack of clear observation of behavioral or developmental changes.

This information indicates that play materials have an observable impact on most children's development, yet it also underscores the need for ongoing observation and possibly improved direction for parents or caregivers to observe such changes more confidently

4.1.37 Opinion on the price of modern toys compared to traditional/indigenous toys

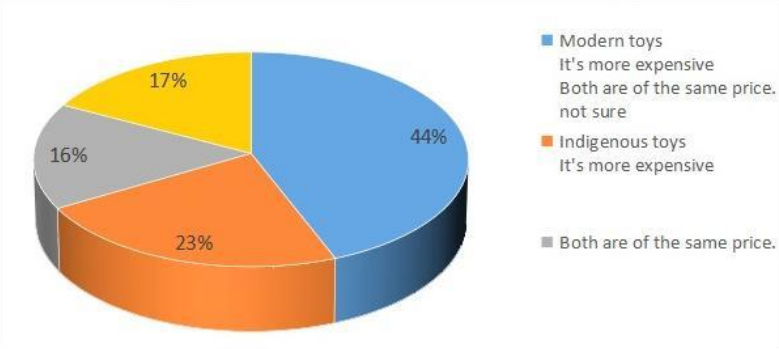

Figure :40

The pie chart displays views on toy prices, contrasting contemporary toys and indigenous/traditional toys. A majority of respondents 44%, hold the view that contemporary toys are costlier than indigenous ones. Contrarily 23%, are of the view that indigenous toys are costlier

indicating some variation in market presence or value perception. In contrast, 16 of respondents opine that the two forms of toys are equally priced, suggesting a uniform assessment. Moreover 17% are uncertain regarding the price differential, either as evidence of insufficient exposure or familiarity with toy prices.

In general, the information points to a common perception that contemporary toys are generally more expensive, perhaps because of branding, materials, or technologies used, whereas traditional toys are seen as being less expensive or easier to access. This information may prove helpful to manufacturers, teachers, and parents in considerations of affordability and cultural acceptability in toy selection

4.1.38 How satisfied are you with the toys you bought for the child

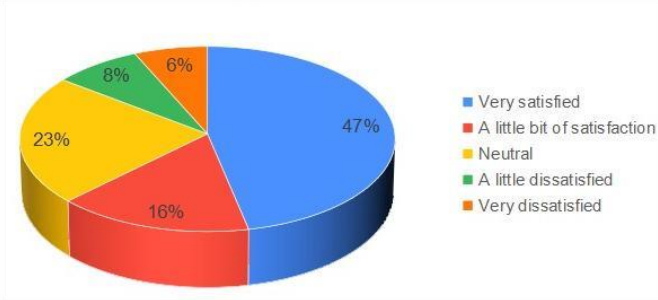

Figure :41

Pie chart depicts answers to the question: Have you seen any difference in your child's behavior or skills since the new or play material was introduced Most respondents 51% said Yes meaning that more than half of the participants noticed improving or remarkable changes in their child after introducing new play materials. In contrast, 25% answered No indicating they did not see any noticeable effect. Also, 24% of the respondents chose Not Sure indicating uncertainty or lack of definite observation on changes in behavior or development.

This information indicates that play materials do have a visible effect on most children's development, but it also emphasizes the need for ongoing observation and maybe improved guidance for parents or guardians to notice such changes more assertively.

4.1.39 What aspects of buying a toy cause your satisfaction or dissatisfaction

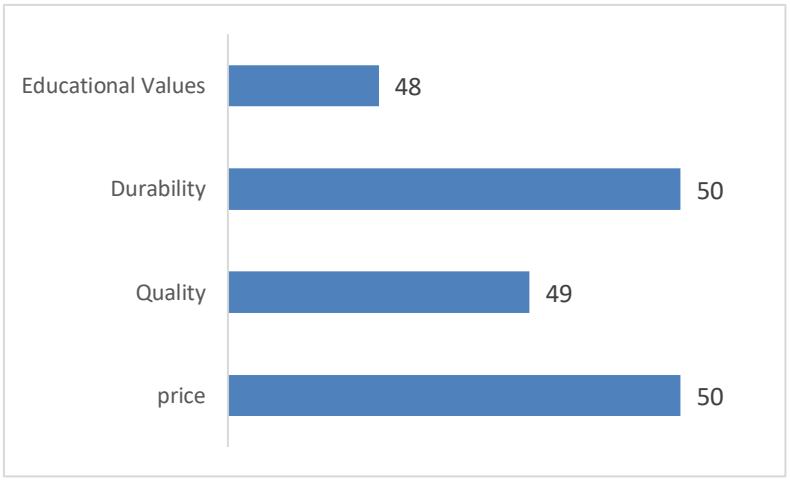

Figure:42

The bar chart shows the reasons why customers are satisfied or dissatisfied while buying toys. Four elements are rated: Educational Values, Durability, Quality, and Price. Of these, Durability and Price rank as the most significant, both being rated at 50, the highest possible. Quality ranks second with a rating of 49, suggesting that it is almost as vital to customers. Educational Values are slightly lower at 48, but also contribute importantly to customer satisfaction. Overall, the graph indicates that practical things like durability and cost are slightly more of a priority than educational value when consumers are evaluating their toy buys.

4.1.40 How satisfied are you with the toys you brought for the child

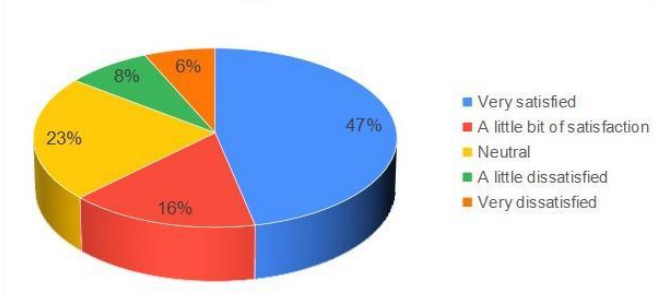

Figure :43

The pie chart shows survey findings on the degree of satisfaction individuals have with the toys they bought for a child. Most of the respondents, 53%, expressed that they were Very satisfied revealing a great deal of satisfaction with their buys. This is trailed by 25% who had A little bit of satisfaction revealing moderate acceptance. Also, 16% of the respondents were Neutral and only small percentages were dissatisfied: 3% were A little dissatisfied and 3% were Very dissatisfied. Overall, the chart indicates that most individuals are generally satisfied with the toys they purchase for children

4.2 Recreation of Traditional Indigenous Pallanguzhi toy by using Eggshell powder

4.2.1 Preparation of Eggshell Powder

1. Egg shell's were collected from households and cleaned were washed thoroughly to remove any residues
2. After boiling eggshell's on a tissue paper for initial drying followed by drying under the sun
3. After drying graind then into a fine powder using a blender

PLATE : 1 Collection of eggshell from different various sectors

PLATE :2 Boiling the egg shell

PLATE : 3 Drying of Eggshell under the sun

PLATE :4 Blended in the mixture of egg shell

4.2.2 Preparing Cornstarch and flex seeds mixture Using Cornflour Powder

1. The cornstarch was prepared by mixing with small amount cornflour powder with cold water
2. Then the mixture is add to a boiling water to make a smooth past with very thin consistency mix thoroughly to lumps formation.the cornstar paste is ready
3. Preparing flax seed powder were take flax seed graint into fine powder and add into the corn starch past

PLATE :5 Flex seed

PLATE :6 Blended flex seed powder

PLATE :7 Corn flour powder

PLATE :8 Corn flour starch

4.2.3 Preparing Pallanguzhi Board Using Eggshell Powder Cornstarch, and Flaxseed Powder

To make a Pallanguzhi board from eggshell powder, cornstarch, and flaxseed powder, begin by well-mixing the eggshell powder and cornstarch in an even proportion. Add finely powdered flaxseed powder slowly, which serves as a natural binder, making the mixture stronger. Mix constantly to create a fine, pliable paste. When the mixture is of the desired consistency, shape it into a rectangle to create the Pallanguzhi board with pits on both sides of the rectangular board. Let the board dry in air for a few hours

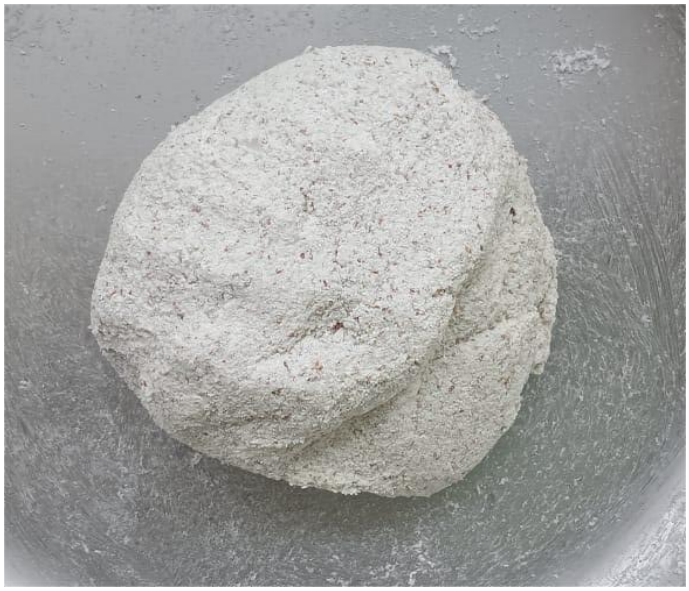

PLATE :9 The mixture of eggshell powder and cornstarch and flex seed powder

PLATE :10 Shaping mixture into pallanguzhi board

PLATE :11 Pallanguzhi toy made from egg shell

4.3 Evaluation Tool

4.3.1 Expert evaluation of pallanguzhi board

The assessment of the new Pallanguzhi board is directed by three primary categories: Design & construction, safety and sustainability, and educational and cultural values. These categories serve to ensure that the board not only maintains the integrity of the original game but also complies with contemporary standards of functionality, child safety, environmental stewardship, and cultural appropriateness. By evaluating the board from these perspectives, the software facilitates comprehensive assessment of the board as a balanced product that is both sustainable and an education-culture material.

TABLE :2 Design & construction

Sl.NO	Headind	Options	(N=12)	%
1	Durability	Moderate	1	8.33%
		Strong	3	25%
		Very Strong	8	66.67%
2	Finish&Appearance	Good	4	33.33%
		Very Good	2	16.67%
		Excellent	6	50%
3	Size&Weight	Moderate	3	25%

		Light	**3**	**25%**
		Very Light	**6**	**50%**

The results of the evaluation by expert ,were evaluatr the pallangugzhi toy based on the following criteria, based on 12 participants' feedback, assessed the durability, finish and appearance, and size and weight of the product. For the aspect of durability, most of the respondents (66.67%) assessed it as very strong, while 25% labeled it strong and a mere 8.33% as moderate, with no ratings of weak or very weak durability. In terms of finish and appearance, 50% of the respondents rated it as excellent, 33.33% rated it as good, and 16.67% rated it as very good, with no ratings for poor or fair quality, reflecting a high overall satisfaction with the product's appearance and surface finish. With regard to weight and size, 50% of respondents reported that the product was very light, 25% light, and another 25% moderate, with no respondent considering it heavy or too heavy. The overall response indicates that the product is very durable, aesthetic, and pleasantly light, all of which point to excellent user satisfaction along the three parameters.

TABLE 3 CHILD SAFETY

SI.NO	Heading	Options	(N=12)	%
1	**Child Safety**	**Moderate**	**4**	**33.33%**
		Easy	**2**	**16.67%**
		Very Easy	**6**	**50%**
2	**Eco-Friendliness**	**Sustainable**	**2**	**16.67%**

		Highly Sustainable	**10**	**83.33%**
3	**c. Maintenance & Cleaning**	**Moderate**	**3**	**25%**
		Easy	**4**	**33.33%**
		Very Easy	**5**	**41.67%**

TABLE :4 Educational &Cultural value

1	**Educational &Cultural value**	**Relevant**	**2**	**16.67%**
		Highly Relevant	**10**	**83.33%**
2	**Cognitive Development**	**Effective**	**3**	**25%**

		Highly Effective	**9**	**75%**
3	**Social Interaction**	**Good**	**3**	**25%**
		Very Good	**8**	**66.6%7**

TABLE :4

A study involving 12 respondents assessed the educational and cultural worth, intellectual growth support, and social interaction advantages of the product. From the aspect of educational and cultural worth, 83.33% of respondents indicated that it was highly related, while 16.67% indicated as related, proving that the product is highly associated with educational and cultural elements. For cognitive improvement, 75% of the participants found the product highly effective and 25% effective, showing strong support for its use in improving cognitive abilities. For social interaction, 66.67% found it very good and 25% found it good, with no participants selecting the lower options, indicating that the product greatly facilitates positive social interaction among users

CHAPTER-5

SUMMARY AND CONCLUSION

The study started with a survey among parents of children under the age of 12 to obtain data regarding several dimensions such as general child information, favorite toys, emotional connection towards toys, indigenous toy interest, demand and selection of toys, media and advertising influence, advice and monitoring by parents, and general satisfaction with toys. Information was obtained for 75 children in this survey.

During the second phase, a Pallanguzhi board, an indigenous toy of the local culture, was created from eco-friendly materials like eggshell powder, cornflour starch, and flaxseed.Eggshells are collected, washed, and boiled in hot water for cleaning, then dried under sunlight. The dried shells are ground into fine powder and mixed with cornstarch paste and flaxseed powder. which is shaped into a Pallanguzhi board . The board is then dried naturally until it hardens.

The third stage included the appraisal of the Pallanguzhi board through a 12-member panel of experts, which examined it according to three significant criteria: (i) construction and design, (ii) sustainability and safety, and (iii) educational and cultural significance.

CONCLUSION

The current research emphasizes the recreation of the original indigenous Pallanguzhi board using eggshell powder as an eco-friendly material. The current research also involves a survey investigating children's responses and interest while playing with the reconstructed toy.

The tool developed successfully captures the cultural and historical importance of the traditional Pallanguzhi game. It emphasizes the significance and increasing popularity of indigenous games in modern society. Through this program, a prototype toy that is not only culturally based but also sustainable, resilient, and eco-friendly was created.

This research investigated the recreation of the traditional Pallanguzhi game with sustainable eggshell powder. It emphasized the cultural and historical significance of Pallanguzhi and uncovered a decline in the popularity of traditional games in the present day. The study examined eggshell powder's characteristics, verifying its strength, lightness, and eco-friendliness as an ideal material. A prototype board was created, and comparisons indicated it to be more sustainable, long-lasting, and easy to use compared to traditional materials. The research advises employing green materials such as eggshell powder in order to revitalize and maintain traditional toys for generations to come.

Limitation

- The board may chip, crack, or wear out with frequent use if not properly sealed or cured.
- structureFlaxseed and cornstarch might not stick well with eggshell powder, leading to a weak .
- Natural materials can break down over time if exposed to air, pests, or moisture.
- It may be hard to get a smooth, polished finish, which can affect how well the game pieces move.

CHAPTER 6

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APPENDIX-1

RECREATION OF INDIGENOUS

I. GENERAL INFORMATION

1.Name of the child?

---

2. What is the age of your child?

---

3. Who usually buy toys for the child?

- ✧ Parent
- ✧ Relatives
- ✧ Friends
- ✧ others

II. TOY PREFERENCES

4. What types of toys does the child play with most often?

- ✧ Dolls
- ✧ Action figures
- ✧ Puzzles
- ✧ Building block
- ✧ Other

5. Does the child prefer playing along or others?

- ✧ Playing alone
- ✧ playing with friend
- ✧ group play

6. What factors influence toy selection?

- ✧ Colour
- ✧ Character
- ✧ Functions
- ✧ brand

III. EMOTIONAL ATTACHMENT TO TOYS

7. How does the child react when their favorite toy is lost or broken?

- ✧ Angry

✧ Sad

✧ Crying

✧ Other

8. Does the child sleep with a specific toy

✧ Yes

✧ No

✧ Sometimes

10. Does the child ever given a name to a toy or treated like a friend?

✧ Yes

✧ No

11.How many hours per day does the child spend playing with toys?

✧ Less than 1 hours

✧ 1 to 2 hours

✧ 2 to 3 hours

✧ More than 3

IV. INDIGENOUS TOY

12. Can you name a few examples of indigenous toys?

✧ Yes

✧ No

13. How did you learn about these toys?

✧ Family

✧ Community

✧ Cultural events

14. Do you think indigenous toys are important for preserving cultural heritage?

✧ Yes

✧ No

✧ Not sure

15. Are indigenous toys readily available in your community or region?

✧ Yes

✧ No

✧ Sometimes

16. How do you typically access or purchase indigenous toys?

✧ Local market

✧ Online stores

✧ Cultural event

17. Do you think there is a need for more accessible and affordable indigenous toys?

✧ Yes

✧ No

V. INTRODUCTION OF NEW TOYS

18. How often do you introduce new toys to the child?

✧ Weekly

✧ Monthly

✧ Rarely

19. What motivates you to introduce new toys to the child?

✧ Birthday

- ✧ Holiday
- ✧ Special occasion

20. How do you typically choose new toys for the child?

- ✧ Online research
- ✧ Recommendations
- ✧ Store browsing

21.How does the child typically react to new toys

- ✧ Excited
- ✧ Curious
- ✧ Hesitant
- ✧ Uninterested

22.What factors influence the child's interact in new toys?

- ✧ Colour
- ✧ Shape
- ✧ Sound
- ✧ Theme

VI. PARENTAL PRESPECTIVE

23.What types of toys does your child prefer?

- ✧ Educational toys
- ✧ Electronic/battery – Operated toy
- ✧ Traditional/indigenous toys
- ✧ Action figures
- ✧ Construction toy (block, LEGO)

✧ Other…

24. What kind of experiences do you think your child gains by playing with toys?

✧ Social interaction

✧ Cognitive skill development

✧ Sensory stimulation

✧ Cultural understanding

✧ Problem-solving skills

✧ Other

25.Do you think your child's toys help in sensory stimulation (e.g. touch, sound, sight)?

✧ Yes

✧ No

✧ Not sure

26.Which sensory features do you believe are most important in a toy?

✧ Sound effects

✧ Texture (soft, smooth, rough)

✧ Bright colour and visuals

✧ Movement

✧ Other…

27.How much do you spend on toys for the child per month?

✧ Less than 500

✧ 500-750

✧ 750-1000

✧ More than 1000

28.Do your children maintain their toys well?

- ✧ Yes
- ✧ No
- ✧ Others

29. Does your children share their toys with others?

- ✧ Yes
- ✧ No
- ✧ Other

30. What factors influence your decision were purchasing toys for the child?

- ✧ Price
- ✧ Educational values
- ✧ Safety

31. Have you ever returned or exchanged a toy due to safety concerns or other issues?

- ✧ Yes
- ✧ No

32. Do you believe that toys Playing an important role in the child's learning and development

- ✧ Yes
- ✧ No

33. Have you noticed any changes in the child's behaviour or abilities since introducing new or play material?

- ✧ Yes
- ✧ No
- ✧ Sometimes

34. What is your opinion about the cost of toys compared to traditional/indigenous toys

- ✧ Modern toys are more expensive
- ✧ Indigenous toys are more expensive
- ✧ Both are same rate

35.Do you feel that expensive toys offer better development value?

- ✧ Yes
- ✧ no

VII. SATISFACTION LEVEL

36. How satisfied are you with the toys you're purchased for the child?

- ✧ Very satisfied
- ✧ Somewhat satisfied
- ✧ Neutral
- ✧ Somewhat dissatisfied
- ✧ Very dissatisfied

37. What aspects of toy purchase contribute to your satisfaction or dissatisfaction

- ✧ Quality
- ✧ Price
- ✧ Durability
- ✧ Educational value

38. Have you even returned or exchanged a toy due to dissatisfaction

- ✧ Yes
- ✧ No

39. How satisfied do you think the child is with the toys they play with ?

- ✧ Very satisfied
- ✧ Somewhat satisfied
- ✧ Neutral
- ✧ Somewhat dissatisfied
- ✧ Very dissatisfied

APPENDIX-II

Testing Tool for Teachers

Project Title: Recreation of Traditional Indigenous Pallanguzhi Toy Using Eggshell Powder

Evaluator: _____

Date: _____

School/Institution: _____

Assessment Criteria

1. Design & Construction Quality

a. Durability: How strong and long-lasting is the eggshell powder Pallanguzhi board?
□ Very Weak (1) □ Weak (2) □ Moderate (3) □ Strong (4) □ Very Strong (5)

b. Finish & Appearance: Does the toy have a smooth and polished surface?
□ Poor (1) □ Fair (2) □ Good (3) □ Very Good (4) □ Excellent (5)

c. Size & Weight: Is the toy comfortable for children to handle?
□ Too Heavy (1) □ Heavy (2) □ Moderate (3) □ Light (4) □ Very Light (5)

2. Safety & Sustainability

a. Child Safety: Are there any sharp edges, harmful substances, or breakable parts?
□ Very Unsafe (1) □ Unsafe (2) □ Moderately Safe (3) □ Safe (4) □ Very Safe (5)

b. Eco-Friendliness: Does the material used (eggshell powder) promote sustainability?
□ Not Sustainable (1) □ Slightly Sustainable (2) □ Moderately Sustainable (3) □ Sustainable (4) □ Highly Sustainable (5)

c. Maintenance & Cleaning: How easy is it to clean and maintain?
□ Very Difficult (1) □ Difficult (2) □ Moderate (3) □ Easy (4) □ Very Easy (5)

---

3. Educational & Cultural Value

a. Cultural Relevance: Does the toy help children connect with indigenous traditions?
□ Not Relevant (1) □ Slightly Relevant (2) □ Moderately Relevant (3) □ Relevant (4) □ Highly Relevant (5)

b. Cognitive Development: Does playing with the toy enhance logical thinking and mathematical skills?

□ Not Effective (1) □ Slightly Effective (2) □ Moderately Effective (3) □ Effective (4) □ Highly Effective (5)

c. Social Interaction: Does the toy encourage social play and communication among children?

□ Not at All (1) □ Slightly (2) □ Somewhat (3) □ Good (4) □ Very Good (5)

APPENDIX III

വരു നമുക്ക് പല്ലാംകുഴി കളിക്കാം

പല്ലാംകുഴി കളി രണ്ട് പേരും കൂടി ആണ് കളിക്കുന്നത് രണ്ടു പേരും പല്ലാംകുഴി ബോർഡിന്റെ ഇരുവശത്ത് സ്ഥാനം ഉറപ്പിക്കുകപല്ലാംകുഴി ബോർഡിലെ ഓരോ കുഴിയിലും നാല് കരുകൾ വീതം നിക്ഷേപിക്കുക, കളി ആരംഭിക്കുന്നത് സ്വന്തം ഭാഗത്തെ കുഴികളിൽ നിന്ന് കരു എടുത്തു കൊണ്ടാണ് രണ്ടിലൊരാൾ കളിച്ച് തുടങ്ങണം. ഓരോ ഓരോ കുഴികളിലായി ഓരോന്നോരോന്നായി ഇട്ടു പോവുക. ഇടക്ക് ഏതെങ്കിലും കുഴിയിൽ തീർന്നുപോയാൽ അടുത്ത കുഴി വൃത്തിയാക്കി അതിന്റെ അടുത്ത കുഴിയിൽ കരു സ്വന്തമാക്കാം. അടുത്തത് അടുത്ത ആളുടെ ഊഴമാണ്ഇങ്ങനെ തുടർന്ന് പോകുന്ന കളിയിൽ ആർക്കാണ് കൂടുതൽ കരു കൈവശം വെച്ചിരിക്കുന്നത്അ വരാണ് കളിയിലെ വിജയി.

പല്ലാങ്കുഴി കളിപ്പാട്ടത്തിന്റെ ഗുണങ്ങൾ

1. ബുദ്ധിശക്തി വർദ്ധിപ്പിക്കുന്നു (Enhances Cognitive Skills)
2. കേന്ദ്രീകൃത ശ്രദ്ധ വികസിപ്പിക്കുന്നു (Improves Concentration)
3. സാമൂഹിക പരിചയം വർദ്ധിപ്പിക്കുന്നു (Enhances Social Skills)
4. സാംസ്കാരിക അവബോധം ഉണർത്തുന്നു (Preserves Cultural Heritage)
5. സഹനശീലവും സഹകരണഭാവവും വളർത്തുന്നു (Builds Patience and Cooperation)
6. കൈയൊതുക്കവും സ്വാഭാവിക ചലനക്ഷമതയും (Develops Fine Motor Skills)
7. ആവേശവും മാനസിക ഉല്ലാസവും നൽകുന്നു (Provides Fun and Mental Relaxation)
8. പുനരുപയോഗവും പരിസ്ഥിതി സൗഹാർദ്ദവുമുള്ള കളി (Eco-friendly and Sustainable Toy)